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LATERAL FLOW TEST STRIPS FOR HG^{2+} IONS DETECTION BASED ON COMBINATION OF OLIGONUCLEOTIDE-MODIFIED GOLD NANOPARTICLES AND CHELATION BY GLUTATHIONE

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Abstract. The environment requires special attention due to the development of the industry, the transition to industrial automation, battery use and human waste disposal. At the same time, the development of analytical test systems makes it possible to determine the content of various contaminants and regulate their entry into the surrounding world. However, a number of toxic contaminants can accumulate in the environment (water, soil) and cause long-term toxic effects on living organisms, including humans. Therefore, the analytical techniques being developed (colorimetric, electrochemical, chromatographic etc.) and the laboratory methods (ICP-MS, ICP-AES) of their analysis existing in practice are in demand.

In our work, we moved away from the usual concept of immunochromatographic analysis and combined reagents on the membrane that were previously used as separate analytical units. We used a G,T-enriched aptamer conjugated with gold nanoparticles, as well as a conjugate of bovine serum albumin with glutathione (BSA-GSH). Conjugate of bovine serum albumin with glutathione (BSA-GSH) was immobilized on nitrocellulose membrane to form the test zone. A conjugate of gold nanoparticles with an aptamer is introduced as a drop into a sample containing Hg^{2+} ions, and then this complex moves along the membrane and binds to the BSA-GSH conjugate. A colored band is formed in the presence of Hg^{2+} in the sample. A linear relationship between the change in the color intensity and the concentration of Hg^{2+} ions in the range from 10 to 1000 ng/mL was observed with limit of mercury detection of 1 ng/mL. Total duration of analysis is 2 min. Thus, the developed technique is promising for Hg^{2+} detection in different water sources to confirm their safety.

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